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12-11-100 GENERAL

12-11-101 Description: The purpose of this rule is to require monitoring and recording of emission data for flares at petroleum refineries.

12-11-110 Exemption, Organic Liquid Storage ~~&~~ and Distribution: The provisions of this rule shall not apply to flares used to control emissions exclusively from organic liquid storage vessels subject to Regulation 8, Rule 5 ~~and~~ or exclusively from loading racks subject to Regulation 8 Rules 6, 33, or 39.

12-11-111 Exemption, Marine Vessel Loading Terminals: The provisions of this rule shall not apply to flares used to control emissions exclusively from marine vessel loading terminals subject to Regulation 8, Rule 44.

12-11-112 Exemption, Wastewater Treatment Systems: The provisions of this rule shall not apply to thermal oxidizers used to control emissions exclusively from wastewater treatment systems subject to Regulation 8, Rule 8.

12-11-113 Exemption, Pumps: The provisions of this rule shall not apply to thermal oxidizers used to control emissions exclusively from pump~~s~~ seals subject to Regulation 8, Rule 18. This exemption does not apply when emissions from a pump are routed to a flare header.

~~**12-11-114 Limited Exemption, Pilot and Purge Gas Reporting:** The requirements of Section 12-11-401.4 shall not apply to any flare for which, as a result of flare design, pilot and purge gas volumetric flow does not vary, provided the owner or operator of the flare submits a report to the APCO setting forth the design parameters that control flow, the expected volumetric flow for each month, and an estimate of the average monthly total hydrocarbon, non-methane hydrocarbon, and sulfur dioxide mass emissions in pounds.~~

12-11-114 Limited Exemption, Flare Data Reporting: The provisions of Section 12-11-401.2, 401.3, 401.5, and 502.3 requiring monitoring and reporting of hydrocarbon and methane composition and hydrocarbon and non-methane hydrocarbon emissions shall not apply to a flare that exclusively serves a sulfur recovery plant or an ammonia plant, or that exclusively burns flexi-coker gas with or without supplemental natural gas.

12-11-200 DEFINITIONS

12-11-201 Flare: A combustion device that uses an open flame to burn combustible gases with combustion air provided by uncontrolled ambient air around the flame. This term includes both ground and elevated flares.

12-11-202 Flaring: A high-temperature combustion process used to burn vent gases.

12-11-203 Gas: The state of matter that has neither independent shape nor volume, but tends to expand indefinitely. For the purposes of this rule, “gas” includes aerosols and the terms “gas” and “gases” are interchangeable.

12-11-204 Petroleum Refinery: A facility that processes petroleum, as defined in the North American Industrial Classification Standard No. 32411, and including any associated sulfur recovery plant.

12-11-205 Pilot Gas: The gas used to maintain the presence of a flame for ignition of vent gases.

12-11-206 Purge Gas: The gas used to maintain a minimum positive pressure to prevent air backflow in the flare system when there is no vent gas.

12-11-207 Sulfur Recovery Plant: A process unit that processes sulfur and ammonia containing material and produces a final product of elemental sulfur.

12-11-208 Thermal Oxidizer: An enclosed or partially enclosed combustion device that is used to oxidize combustible gases and that generally comes equipped with controls for combustion chamber temperature and often with controls for air/fuel mixture.

12-11-209 Vent Gas: Any gas directed to a flare excluding assisting air or steam, flare pilot gas, and any continuous purge gases.

12-11-400 ADMINISTRATIVE REQUIREMENTS

12-11-401 Flare Data Reporting Requirements: The owner or operator of a flare shall submit a monthly report to the APCO on or before ~~45~~ 30 days after the end of each month for each flare subject to this rule. Reports are not required for each flare in a staged or cascading flare system if all flares in the system serve the same header. The report shall be in an electronic format approved by the APCO. Each monthly report shall include all of the following:

401.1 The total volumetric flow of vent gas in standard cubic feet for each day and for the month, and, effective for the first full month after the commencement of the monitoring required by Section 12-11-501, for each hour of the month.

401.2 If vent gas composition is monitored using manual sampling or an auto-sampler, total hydrocarbon content as propane, methane content, and, hydrogen sulfide content for each sample required by Section 12-11-502.

401.3 If vent gas composition is monitored by continuous analyzers pursuant to Section 12-11-502, average total hydrocarbon content as propane, average methane content, and, depending upon the analytical method used pursuant to Section 12-11-601, total reduced sulfur content or hydrogen sulfide content of vent gas flared for each hour of the month.

401.4 For any pilot and purge gas used, the type of gas used, the volumetric flow for each day and for the month, and the means used to determine flow. If, as a result of flare design, pilot and purge gas volumetric flow does not vary, the report may note the design parameters that control flow, and the expected volumetric flow for each month.

401.5 An estimate of the daily average and total monthly total hydrocarbon, non-methane hydrocarbon, and sulfur dioxide mass emissions in pounds from each flare, including, but noted separately, any emissions from pilot and purge gas combustion. Calculations shall assume a flare ~~combustion~~ control efficiency of 98% for hydrocarbons.

401.6 For any 24-hour period during which more than 1.2 million standard cubic feet of vent gas was flared, a~~A~~ description of ~~each~~ the flaring ~~event~~ including~~, for each event,~~ the cause, time of occurrence and duration, the source or equipment from which the vent gas originated, and any measures taken to reduce or eliminate flaring.

401.7 Flare monitoring system downtime periods greater than 24 hours, including dates and times, and an explanation for each period of inoperation.

12-11-402 Flow Verification Report: Effective nine months after adoption of this rule and every six months thereafter, the owner or operator of a flare shall submit a report to the APCO for each flare subject to the rule. The report shall compare flow as measured by the flow monitoring equipment required by Section 12-11-501 and a flow verification pursuant to Section 12-11-602 for the same period or periods of time.

12-11-500 MONITORING AND RECORDS

12-11-501 Vent Gas Flow Monitoring: Effective 180 days after adoption of this rule, the owner or operator of a petroleum refinery shall not operate a flare unless vent gas to the flare is continuously monitored for volumetric flow by a device that meets the following ~~specifications~~requirements:

501.1 The minimum detectible velocity shall be 0.1 foot per second.

501.2 The device shall continuously measure the range of flow rates corresponding to velocities from 0.5 to 275 feet per second in the header in which the device is installed.

501.3 The device shall continuously measure molecular weight.

501.4 The device shall be installed at a location ~~on the flare header after the knock-out pot, after any water seals, and after all locations at which supplementary fuel is introduced~~ where measured volumetric flow is representative of flow to the flare or to the flare system in the case of a staged or cascading flare system consisting of more than one flare.

12-11-502 Vent Gas Composition Monitoring: The owner or operator of a petroleum refinery shall not operate a flare unless the following requirements are met:

502.1 Requirements applicable to all vent gas composition monitoring:

1.1 Vent gas monitored for composition, whether by sampling or continuous ~~analysis~~monitoring, shall be taken from a location ~~on the flare header after the knock-out pot and after all locations at which supplementary fuel is introduced~~at which samples are representative of vent gas composition.

~~1.2~~ If flares share a common header, a sample from the header will be deemed representative of vent gas composition for all flares served by the header.

1.~~3~~2 The monitoring system shall provide access for the APCO to collect vent gas samples to verify the analysis required by this Section.

502.2 Effective 60 days after adoption of this rule and until the requirements of Section 12-11-502.3 are met, the owner or operator shall monitor vent gas composition through sampling that meets the following requirements:

~~1~~2.1 The minimum sampling frequency shall be one sample per day.

2.2 Samples may be taken from the flare header or from an alternate location at which samples are representative of vent gas composition.

~~1~~2.~~2~~3 Samples shall be analyzed pursuant to Section 12-11-601.

502.~~2~~3 Effective 270 days after adoption of this rule, the owner or operator shall monitor vent gas composition using one of the following three methods:

~~2~~3.1 Sampling that meets the following requirements:

a. The minimum sampling frequency shall be one sample per day.

b. If the volume of vent gas flared in any consecutive 60 minute period exceeds 50,000 standard cubic feet, a sample shall be taken within 15 minutes if an auto-sampler is being used or within 30 minutes if manual sampling is being used. The sampling frequency thereafter shall be one sample every 3 hours until the volume of vent gas in any consecutive 60 minute period is 50,000 standard cubic feet or less.

c. Samples shall be analyzed pursuant to Section 12-11-601.

~~2~~3.2 Continuous analyzers that meet the following requirements:

a. The analyzers shall continuously monitor for total hydrocarbon, methane, and, depending upon the analytical method used pursuant to Section 12-11-601, hydrogen sulfide or total reduced sulfur.

b. The hydrocarbon analyzer shall have a full-scale range of 100% total hydrocarbon.

c. ~~Each analyzer shall be calibrated in accordance with the manufacturer's specifications.~~

~~d~~c. Each analyzer shall be maintained to be accurate to within twenty percent when compared to any field accuracy tests or to within 5% of full scale.

~~2~~3.3 Gas chromatography that meets the following requirements:

a. The gas chromatography system shall monitor for total hydrocarbon, methane, and hydrogen sulfide.

b. ~~The gas chromatography system shall be calibrated in accordance with the manufacturer's specifications.~~

~~c~~b. The gas chromatography system shall be maintained to be accurate to ~~within twenty percent when compared to any field accuracy tests or to~~ within 5% of full scale.

12-11-503 Pilot Monitoring: Any flare subject to this rule must be equipped and operated with an automatic igniter or a continuous burning pilot, which must be maintained in good working order. If a pilot flame is employed, the flame shall be ~~present at all times and shall be~~ monitored with a device to detect the presence of the pilot flame. If an electric arc ignition system is employed, the system shall pulse on detection of loss of pilot flame and until the pilot flame is reestablished.

12-11-504 Pilot and Purge Gas Monitoring: The owner or operator of a petroleum refinery shall not operate a flare unless (1) volumetric flows of purge and pilot gases ~~is~~ are monitored by ~~a~~ flow measuring devices, or (2) other parameters are monitored so that volumetric flows of pilot and purge gas ~~can~~ may be calculated based on pilot design and the parameters monitored.

12-11-505 Recordkeeping Requirements: Except as provided in Section 12-11-507, the owner or operator of a flare shall maintain records for all the information required to be monitored for a period of five years and make such records available to the APCO upon request.

12-11-506 General Monitoring Requirements: Persons responsible for monitoring subject to this rule shall comply with the following:

506.1 ~~Monitor P~~periods of monitor inoperation greater than 24 continuous hours shall be reported by the following working day, followed by notification of resumption of monitoring. Adequate proof of expeditious repair shall be furnished to the APCO for downtime in excess of fifteen consecutive days. Periods of monitor inoperation shall not exceed 30 days per calendar year.

506.2 ~~Monitor periods of inoperation shall not exceed 15 consecutive days or 30 days per calendar year.~~ During periods of inoperation of continuous analyzers installed pursuant to Section 12-11-502, persons responsible for monitoring shall take samples as required by Section 12-11-502.2.1. During periods of inoperation of flow monitors required by Section 12-11-501, flow shall be determined pursuant to Section 12-11-602.~~Adequate proof of expeditious repair shall be furnished to the APCO for downtime in excess of fifteen consecutive days.~~

506.3 The person(s) responsible for monitors subject to this rule shall maintain and calibrate all required monitors and recording devices in accordance with the applicable manufacturer's specifications. In order to claim that a manufacturer's specification is not applicable, the person responsible for emissions must have, and follow, a written maintenance policy that was developed for the device in question. The written policy must explain and justify the difference between the written procedure and the manufacturer's procedure.

506.4 Data Recording System: All in-line continuous analyzer and flow monitoring data must be continuously recorded by an electronic data acquisition system capable of one-minute averages. Flow monitoring data shall be recorded as one-minute averages.

12-11-507 Video Monitoring: ~~[Two options follow:]~~

~~[Option 1]~~

~~The owner or operator of a flare subject to this rule shall maintain equipment that captures a real-time image of the flare and flame and makes the image available to the World Wide Web. The image of the flare shall be of sufficient size and contrast to be readily apparent in the overall image or frame.~~

~~Note: Option 1 would have to be accompanied by an exemption that ensures that it is not a violation if a refinery's internet service provider is down; if there is an internet disruption; if a computer user attempting to access a flare site has a bandwidth problem, an internet service problem, a hardware problem, a software problem, or any incompatibility; etc.]~~

~~[Option 2]~~

For each flare equipped with video monitoring capability as of January 1, 2003, t~~T~~he owner or operator of a flare subject to this rule shall, effective 90 days after adoption of this rule, install and maintain equipment that records a real-time image of the flare and flame at a frame rate of no less than 1 frame per second. The recorded image of the flare shall be of sufficient size, ~~and~~ contrast, and resolution to be readily apparent in the overall image or frame. The image shall include an embedded date and time stamp. The equipment shall archive the images for each 24-hour period, and the owner or operator of the a flare shall retain each 24-hour archive recorded during a month ~~for no less than 72 hours~~until 15 days after submission of the monthly report required by Section 12-11-401 for that month. Effective 180 days after adoption of this rule, for any flare for which the report required by Section 12-11-401 shows that more than 1.2 million standard cubic feet of vent gas was flared in any 24-hour period, the owner or operator of the flare shall, within 90 days after the end of the month covered by the report, meet the same requirements as those imposed by this Section for flares with existing video monitoring capability.

12-11-600 MANUAL OF PROCEDURES

12-11-601 Testing, Sampling, and Analytical Methods:

601.1 If samples are taken manually or with an auto-sampler, samples shall be analyzed using the following test methods where applicable:

1.1 Total hydrocarbon content and methane content of vent gas shall be determined using ASTM Method D1945-96, ASTM Method UOP 539-97, or EPA Method 18.

1.2 Hydrogen sulfide content of vent gas shall be determined using ASTM Method D1945-96 or ASTM Method UOP 539-97.

1.3 Any alternative method to the above methods if approved by the APCO and EPA.

601.2 Except as provided in Section 12-11-601.3, if vent gas composition is monitored using continuous analyzers, the analyzers shall employ the following methods where applicable:

2.1 Total hydrocarbon content and methane content of vent gas shall be determined using EPA Method 25A or 25B.

2.2 Total reduced sulfur content of vent gas shall be determined using ASTM Method D4468-85.

2.3 Hydrogen sulfide content shall be determined using ASTM Method D4084-94.

2.4 Any alternative method to the above methods if approved by the APCO and EPA.

601.3 If vent gas composition is monitored with a continuous analyzer employing gas chromatography, the following requirements shall be met:

3.1 ASTM Method D1945-96 or ASTM Method UOP 539-97 shall be used.

3.2 The system shall analyze samples for total hydrocarbon content, methane content, and hydrogen sulfide content.

3.3 The minimum sampling frequency shall be one sample every ~~15~~ 30 minutes.

3.4 Any alternative method to the above methods if approved by the APCO and EPA.

12-11-602 Flow Verification Test Methods: For purposes of the semi-annual verification required by Section 12-11-402, vent gas flow shall be determined using one or more of the following methods:

602.1 District Manual of Procedures, Volume IV, ST-17 and ST-18;

602.2 EPA Methods 1 and 2;

602.3 Other flow monitoring devices or process monitors.

602.4 Any method recommended by the manufacturer of the flow monitoring equipment installed pursuant to Section 12-11-501.

602.~~4~~5 Tracer gas dilution or velocity.

602.~~5~~6 Engineering calculations of the volumes of all vent gas directed past the flow monitoring device required by Section 12-11-501. These calculations shall be based upon measurements of temperature, pressure, flow, or other parameters or on known sizes, capacities, or rates for each unit or vessel contributing vent gas during the period or periods for which the verification is prepared.

602.~~6~~7 Any alternative method approved by the APCO and EPA.

Explanation of Changes from 3/25/03 Draft

Section	Explanation
110, 111, 112, 113	Word “exclusively” added to ensure that other emissions are not diverted to the exempted devices
114	Pilot and purge gas exemption deleted and replaced with language in Section 401.4; new exemption for non-hydrocarbon flares added: exempts from monitoring and reporting for hydrocarbons flares at ammonia plants, sulfur plants, and flares burning exclusively flexi-coker gas
401	Reports due w/in 30 days of end of month rather than 45; clarification added for staged or cascading flares so that report not required for multiple flares on a single header
401.4	See explanation for Section 114
401.5	Clarification added to ensure that 98% is used in calculations as control efficiency for hydrocarbons rather than as overall efficiency (which might allow higher than 98% to be used for hydrocarbons)
401.6	Language added to clarify that root cause analysis only required for flaring over the specified threshold
501.4	Prescriptive language for flow monitor location dropped in favor of more general language that addresses the variety of flare arrangements
502.1	Same as above
502.2	Same as above; numbering fixed, interim nature of requirement clarified
502.3	Numbering fixed
502.3.2.c	Language duplicating that in Section 506.3 deleted
502.3.3.b	Same as above
502.3.3.c	Language deleted b/c no field accuracy test for GCs
503	Language modified to reflect normal practice of using electronic ignition as backup to pilot
504	Clarification of language
506.1	Language corrected to parallel Reg. 1-522.4
506.2	Requirement to calculate flow during flow monitor downtime added
506.4	Language added to clarify that flow data is to be recorded and retained as one-minute averages
507	Video monitoring language proposed with more lengthy retention of recordings
601.3	Sample frequency for GCs changed to 30 minutes to ensure time is available to sample compounds beyond those required or to monitor two headers with one GC
602	Language added to allow use of any method recommended by manufacturer to validate flow meters